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MISCELLANEOUS CORRESPONDENCE ZONE K SOLID WASTE MANAGEMENT UNIT 44 (SWMU 44) AND OTHER SITES CNC CHARLESTON SC
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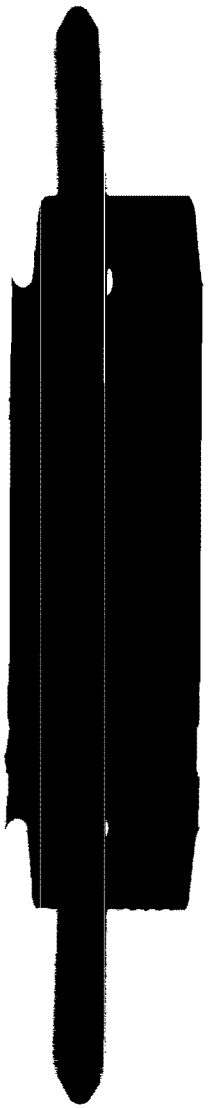

5090/11
Code 18B1
2 April 2001

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: SUBMITTAL OF ZONE K RCRA FACILITY INVESTIGATION WORK PLAN

Dear Mr. Litton,

The purpose of this letter is to submit the RCRA Facility Investigation Work Plan Addendum (Revision 1) for Zone K, located at Naval Station Annex in Charleston, SC. The work plan addendum is submitted to fulfill the requirements of condition II.C.1 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency (EPA).

The pages forwarded by this letter modify the original submittal (Revision 0). The enclosure included page changes, responses to DHEC comments, DHEC's approval of referenced documents, and additional figures to response to DHEC comments. This document has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process and has been distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate.

If you should have any questions, please contact, Matthew Humphrey or myself at (843) 743-9985 and (843) 820-5551 respectively.

Sincerely,

ROBERT A. HARRELL, JR., P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4)
USEPA (Dann Sparlosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

CIRC 18713 Daily

18713

Basis for Soil Removal at SWMU 44

PREPARED FOR: Mihir Mehta (SCDHEC), Paul Bergstrand (SCDHEC), David Scaturo (SCDHEC), Susan Byrd (SCDHEC) Dann Spariousu (EPA Region IV), Tony Hunt (Navy), Rob Harrel (Navy)

PREPARED BY: Paul Favara, Vijaya Mylavarapu

COPIES: Dean Williamson, Gary Foster, Tom Beisel

DATE: April 23, 2001

Introduction

The single most critical factor in development of the Interim Measure (IM) Work Plan (WP) for soil remediation at SWMU 44 is definition of the Media Cleanup Standard (MCS) for arsenic. The purpose of this memorandum is to present the basis for selecting a MCS for arsenic at SWMU 44 and solicit regulatory comment.

The basis for selecting an MCS for arsenic has been briefly discussed in conversations between Susan Byrd (SCDHEC) and Vijaya Mylavarapu (CH2M-Jones). Once a basis for an arsenic MCS is agreed upon, CH2M-Jones will finalize the Rev. 0 Interim Measure (IM) Work Plan (WP).

Introduction

During the April BCT meeting, the overall approach to remediating soil at SWMU 44 was presented to the BCT team. The April presentation was based on a MCS of 20 mg/kg. The MCS is supported by EPA in a transmittal letter dated March 30, 2001.

Verbal comments to the 20 mg/kg MCS were provided by SCDHEC staff at the meeting. While SCDHEC staff did not question the validity of EPA's position on arsenic in soil, they would prefer a site- or base-specific reference level based approach to developing a specific MCS for arsenic at SWMU 44, as well as other SWMUs and AOCs at CNC. The BCT discussed this comment at length and concluded that:

- the EPA recommended MCS of 20 mg/kg could be used as one potential argument in supporting a specific MCS; and
- the full range of constituent concentrations in the zone-specific and/or base-wide reference data set should be evaluated to define an appropriate reference value applicable to the specific SWMU or AOC. The specific MCS for arsenic at a given site could be less than or greater than 20 mg/kg, depending on site conditions and related factors.

Based on the above listed reasons, CH2M-Jones is revising the MCS for arsenic at SWMU 44, using information relevant to this site and CNC as a whole.

Prior to finalizing the excavation plan for the IM at SWMU 44, regulatory input to the MCS development process, presented below, is requested.

Basis and Recommendation for Arsenic MCS at SWMU 44

A separate MCS will be developed for surface and subsurface soil.

Surface Soil

The statistically estimated Zone C reference concentration for arsenic, as presented in the Final Zone C RFI, was 14.2 mg/kg. Table 1 (note this table presents the original grid sample population for the RFI as well as new samples collected in March 2001) presents the full data set for arsenic in surface soil grid samples in Zone C, sorted from highest to lowest value. The Zone C reference concentration was a UTL 95%value, after the three highest grid data points (39.4, 22.4, 22.3 mg/kg) were removed from the sample population.

The three highest concentration data points were removed from the reference sample population because they were considered "outliers." However, these samples are representative of anthropogenic background conditions at the base. Therefore, as discussed at the BCT Meeting in April, the full range of arsenic results from grid locations was evaluated. The resulting UTL95% from the full data set was calculated as 28.7 mg/kg.

Additional soil samples were collected in March 2001 to characterize BEQ concentrations at railroad tracks; arsenic was also targeted for analysis in these samples. The railroad samples included samples from near/under railroad ties, and adjacent runoff areas. The results of this dataset are highlighted in Table 1. Eight of the railroad track samples were collected from areas adjacent to Zone C.

The arsenic concentrations in the eight samples ranged from 7.29 to 91.7 mg/kg. Since SWMU 44 has extensive railroad tracks running through the site, and some of the highest observed arsenic concentrations were near the railroad tracks, these railroad sample concentrations were included in a UTL95% calculation for Zone C. When all the "non-SWMU" (i.e., original grid samples as well as railroad samples collected in March 2001) samples are included in the UTL95% calculation, the new UTL95% was calculated as 66.1 mg/kg.

In addition to the above site-specific information, another factor to consider in development of a MCS is a recent position EPA Region IV has taken on arsenic. This position was outlined in a letter prepared by Dann Spariosu and submitted to Mihir Mehta of SCDHEC. The letter recommends a remediation goal of 20 mg/kg for arsenic in soil and cites a general range of arsenic background of 10 to 30 mg/kg within EPA Region IV.

Given the above information, CH2M-Jones recommends a MCS for arsenic be set at 28.7 mg/kg. The basis of this recommendation is:

- the proposed MCS represents the UTL95% for the original reference sample population; and

- the value is less than the upper end of the background range of arsenic with in Region IV (i.e., 30 mg/kg).

Though inclusion of the new (March 2001) railroad samples is applicable in the development of a MCS for SWMU 44, this new data has not included as a conservative measure.

It should be noted that developing a SSL based MCS was considered. Using EPA default assumptions, and a DAF of 10, the SSL for arsenic in soil is 14.5 mg/kg. As this value is less than the reference concentration of 28.7 mg/kg, the reference concentration would be the more relevant than the SSL in deriving a MCS.

Subsurface Soils

The Zone C reference value for arsenic in subsurface soil, as presented in the Final Zone C RFI, was 14.1 mg/kg. Table 2 presents the full data set for arsenic in subsurface soil grid samples in Zone C, sorted from highest to lowest value. The reference value was an estimated UTL95% 95% value, after the highest data point (31.6 mg/kg) was removed from the sample population.

The basis for the removal of the highest data point was that it was considered an "outlier." However, the outlier is representative of anthropogenic background conditions at the base. Therefore, as discussed at the BCT Meeting in April, the full range of arsenic results from grid locations was included in the reference concentration estimations. The resulting UTL95% was calculated as 32.0 mg/kg.

However, at a future time, any construction activity may mix subsurface and surface soil. Given this scenario, and the closeness of the calculate UTL95% values for surface (28.7 mg/kg) and subsurface (32.0 mg/kg) soil, CH2M-Jones recommends the MCS for subsurface soil be the same as surface soil.

It should be noted that developing a SSL based MCS was considered. Using EPA default assumptions, and a DAF of 10, the SSL for arsenic in soil is 14.5 mg/kg. As this value is less than the reference concentration of 28.7 mg/kg, the reference concentration would be the more relevant than the SSL in deriving a MCS.

Determination of Soil Excavation Limits

Surface and subsurface soils will be discussed separately.

Surface Soil Excavation

As presented above, the recommended MCS for arsenic both surface and subsurface soil is 28.7 mg/kg. The objective of the IM is to ensure that, when the IM is complete, the site concentration is same as the area reference levels (e.g., Zone C). Note that it is possible for individual soil samples within SWMU 44 to exceed the statistically based MCS, provided that the site statistical average concentration is less than the MCS. A one-half acre box will

be used as an exposure area for future assumed residential land use, where statistical upper-bound averages (e.g., UCL95) are at or below reference levels for arsenic.

A step-wise process will be utilized to determine excavation extents:

1. Initially, the full range of SWMU data will be evaluated and a UCL95 calculation will be performed to produce a site upper-bound estimate on the average concentration. This step will determine if the site data, as a whole, exceeds the MCS. No excavation contours will be developed as part of completing this step. Rather, results from this evaluation will determine the overall statistical average concentration of the exposure unit, (i.e., the SWMU).

2. A half-acre box will be moved over the site with the purpose to "box-in" as many of the highest arsenic levels on the site. Several half-acre box calculations will be performed, as required, to address all the highest concentrations areas. Once a box is drawn around the samples, a UCL95 will be calculated for data within the box. If the UCL95 concentration is less than the MCS, no excavation will be required within the box. If the UCL95 is greater than the MCS, then soil will require removal.

3. Two-dimensional kriging will be used to estimate the extent of excavation within boxes that are determined to require soil removal (based on results of Step 2 above). Where excavation is required in a half-acre box, it will be assumed that the sample locations where soil is being removed will be replaced with "clean soil".

Subsurface Soil Excavation

As presented above, the recommended MCS for arsenic in subsurface soil is 28.7 mg/kg. Although there is no direct exposure to human receptors for the subsurface soil, the MCS will be used assuming subsurface soils is mixed uniformly with surface soil under a construction scenario.

The same stepwise process used to delineate the extent of surface soil requiring removal, as described above, will also be used for subsurface soil removal.

Table 1. Grid and Railroad Samples ("non-SWMU") Samples Collected in Zone C - Arsenic
(data collected to support Railroad Samling effort is highlighted in yellow)
Sorted from Highest to Lowest Concentration

SiteID	StationID	SampleID	ParamID	AnaValue	Units	ProjQual	DateCollected	UpperDepth	Data Set
GDC	GDLSB01301	GDLSB01301	AS	91.7	MG/KG	=	3/22/01	0	March 2001 Data
GDC	GDLSB01201	GDLSB01201	AS	74.1	MG/KG	=	3/22/01	0	March 2001 Data
GDC	CGDCSB002	GDCSB00201	AS	39.4	MG/KG	=	3/13/95	0	RFI Background Data Set
GDC	GDLSB01701	GDLSB01701	AS	30.1	MG/KG	=	3/22/01	0	March 2001 Data
GDC	GDLSB01801	GDLSB01801	AS	27.9	MG/KG	=	3/22/01	0	March 2001 Data
GDC	GDLSB01401	GDLSB01401	AS	26.2	MG/KG	=	3/22/01	0	March 2001 Data
GDC	CGDCSB028	GDCSB02801	AS	22.4	MG/KG	=	4/20/95	0	RFI Background Data Set
GDC	CGDCSB031	GDCSB03101	AS	22.3	MG/KG	=	4/17/95	0	RFI Background Data Set
GDC	GDLSB01601	GDLSB01601	AS	17.4	MG/KG	=	3/22/01	0	March 2001 Data
GDC	GDLSB01901	GDLSB01901	AS	14.5	MG/KG	=	3/22/01	0	March 2001 Data
GDC	CGDCSB021	GDCSB02101	AS	12.5	MG/KG	=	4/11/95	0	RFI Background Data Set
GDC	CGDCSB035	GDCSB03501	AS	10.2	MG/KG	=	4/12/95	0	RFI Background Data Set
GDC	CGDCSB017	GDCSB01701	AS	9.6	MG/KG	J	4/10/95	0	RFI Background Data Set
GDC	GDLSB01501	GDLSB01501	AS	7.29	MG/KG	=	3/22/01	0	March 2001 Data
GDC	CGDCSB005	GDCSB00501a	AS	7.2	MG/KG	=	3/17/95	0	RFI Background Data Set
GDC	CGDCSB036	GDCSB03601	AS	6.6	MG/KG	=	4/17/95	0	RFI Background Data Set
GDC	CGDCSB041	GDCSB04101	AS	5.3	MG/KG	=	6/28/95	0	RFI Background Data Set
GDC	CGDCSB019	GDCSB01901	AS	3.8	MG/KG	J	4/14/95	0	RFI Background Data Set
GDC	CGDCSB006	GDCSB00601b	AS	3.4	MG/KG	=	3/17/95	0	RFI Background Data Set
GDC	CGDCSB025	GDCSB02501	AS	3.3	MG/KG	J	4/12/95	0	RFI Background Data Set
GDC	CGDCSB001	GDCSB00101a	AS	3	MG/KG	=	3/15/95	0	RFI Background Data Set
GDC	CGDCSB043	GDCSB04301	AS	3	MG/KG	U	6/28/95	0	RFI Background Data Set
GDC	CGDCSB009	GDCSB00901	AS	2.7	MG/KG	UJ	3/31/95	0	RFI Background Data Set
GDC	CGDCSB037	GDCSB03701	AS	2.7	MG/KG	=	4/12/95	0	RFI Background Data Set
GDC	CGDCSB039	GDCSB03901b	AS	2.6	MG/KG	=	6/29/95	0	RFI Background Data Set
GDC	CGDCSB040	GDCSB04001b	AS	2.6	MG/KG	=	6/29/95	0	RFI Background Data Set
GDC	CGDCSB029	GDCSB02901	AS	2.5	MG/KG	U	4/17/95	0	RFI Background Data Set
GDC	CGDCSB003	GDCSB00301b	AS	2.4	MG/KG	=	3/17/95	0	RFI Background Data Set
GDC	CGDCSB015	GDCSB01501	AS	2.4	MG/KG	J	4/10/95	0	RFI Background Data Set
GDC	CGDCSB038	GDCSB03801a	AS	2.3	MG/KG	U	6/29/95	0	RFI Background Data Set
GDC	CGDCSB030	GDCSB03001	AS	2.1	MG/KG	U	4/17/95	0	RFI Background Data Set

GDC	CGDCSB044	GDCSB04401	AS	2	MG/KG	U	6/28/95	0 RFI Background Data Set
GDC	CGDCSB024	GDCSB02401	AS	1.8	MG/KG	=	4/11/95	0 RFI Background Data Set
GDC	CGDCSB018	GDCSB01801	AS	1.7	MG/KG	J	4/14/95	0 RFI Background Data Set
GDC	CGDCSB042	GDCSB04201	AS	1.6	MG/KG	U	6/28/95	0 RFI Background Data Set
GDC	CGDCSB012	GDCSB01201	AS	1.5	MG/KG	=	4/11/95	0 RFI Background Data Set
GDC	CGDCSB020	GDCSB02001	AS	1.4	MG/KG	J	4/11/95	0 RFI Background Data Set
GDC	CGDCSB007	GDCSB00701	AS	1	MG/KG	J	4/14/95	0 RFI Background Data Set
GDC	CGDCSB023	GDCSB02301	AS	0.79	MG/KG	J	4/11/95	0 RFI Background Data Set
GDC	CGDCSB013	GDCSB01301	AS	0.77	MG/KG	J	4/11/95	0 RFI Background Data Set
GDC	CGDCSB026	GDCSB02601	AS	0.74	MG/KG	J	4/17/95	0 RFI Background Data Set
GDC	CGDCSB004	GDCSB00401a	AS	0.73	MG/KG	J	4/14/95	0 RFI Background Data Set
GDC	CGDCSB027	GDCSB02701	AS	0.7	MG/KG	U	4/20/95	0 RFI Background Data Set
GDC	CGDCSB016	GDCSB01601	AS	0.62	MG/KG	J	4/10/95	0 RFI Background Data Set
GDC	CGDCSB033	GDCSB03301	AS	0.6	MG/KG	J	4/11/95	0 RFI Background Data Set
GDC	CGDCSB008	GDCSB00801a	AS	0.58	MG/KG	J	3/17/95	0 RFI Background Data Set
GDC	CGDCSB010	GDCSB01001	AS	0.41	MG/KG	UJ	4/10/95	0 RFI Background Data Set
GDC	CGDCSB022	GDCSB02201	AS	0.4	MG/KG	J	4/11/95	0 RFI Background Data Set
GDC	CGDCSB011	GDCSB01101	AS	0.38	MG/KG	UJ	4/10/95	0 RFI Background Data Set
GDC	CGDCSB014	GDCSB01401	AS	0.35	MG/KG	UJ	4/14/95	0 RFI Background Data Set
GDC	CGDCSB034	GDCSB03401	AS	0.33	MG/KG	U	4/11/95	0 RFI Background Data Set
GDC	CGDCSB032	GDCSB03201	AS	0.33	MG/KG	UJ	4/12/95	0 RFI Background Data Set

Table 2. Grid Samples Collected in Zone C - Arsenic
Sorted from Highest to Lowest Concentration

SiteID	StationID	SampleID	ParamID	AnaValue	Units	ProjQual	DateCollected	UpperDepth
GDC	CGDCSB030	GDCSB03002	AS	31.6	MG/KG	=	4/17/95	3
GDC	CGDCSB010	GDCSB01002	AS	14.1	MG/KG	J	4/10/95	3
GDC	CGDCSB004	GDCSB00402a	AS	12.1	MG/KG	J	4/14/95	3
GDC	CGDCSB036	GDCSB03602	AS	11.2	MG/KG	=	4/17/95	3
GDC	CGDCSB028	GDCSB02802	AS	6.4	MG/KG	=	4/20/95	3
GDC	CGDCSB008	GDCSB00802a	AS	5.4	MG/KG	=	3/17/95	3
GDC	CGDCSB027	GDCSB02702	AS	4.9	MG/KG	U	4/20/95	3
GDC	CGDCSB009	GDCSB00902	AS	3.1	MG/KG	J	3/31/95	3
GDC	CGDCSB039	GDCSB03902	AS	2.7	MG/KG	=	6/29/95	3
GDC	CGDCSB025	GDCSB02502	AS	1.9	MG/KG	J	4/12/95	3
GDC	CGDCSB035	GDCSB03502	AS	1.9	MG/KG	=	4/12/95	3
GDC	CGDCSB029	GDCSB02902	AS	1.6	MG/KG	U	4/17/95	3
GDC	CGDCSB031	GDCSB03102	AS	0.83	MG/KG	U	4/17/95	3
GDC	CGDCSB015	GDCSB01502	AS	0.62	MG/KG	J	4/10/95	3
GDC	CGDCSB012	GDCSB01202	AS	0.44	MG/KG	J	4/11/95	3
GDC	CGDCSB024	GDCSB02402	AS	0.4	MG/KG	U	4/11/95	3
GDC	CGDCSB001	GDCSB00102b	AS	0.37	MG/KG	U	3/15/95	3
GDC	CGDCSB019	GDCSB01902	AS	0.36	MG/KG	UJ	4/14/95	3
GDC	CGDCSB026	GDCSB02602	AS	0.36	MG/KG	UJ	4/17/95	3
GDC	CGDCSB032	GDCSB03202	AS	0.36	MG/KG	J	4/12/95	3
GDC	CGDCSB013	GDCSB01302	AS	0.34	MG/KG	U	4/12/95	3
GDC	CGDCSB020	GDCSB02002	AS	0.34	MG/KG	UJ	4/11/95	3
GDC	CGDCSB033	GDCSB03302	AS	0.34	MG/KG	U	4/11/95	3
GDC	CGDCSB037	GDCSB03702	AS	0.34	MG/KG	U	4/12/95	3
GDC	CGDCSB038	GDCSB03802b	AS	0.34	MG/KG	U	6/29/95	3
GDC	CGDCSB014	GDCSB01402	AS	0.33	MG/KG	UJ	4/14/95	3
GDC	CGDCSB021	GDCSB02102	AS	0.33	MG/KG	U	4/11/95	3
GDC	CGDCSB022	GDCSB02202	AS	0.33	MG/KG	U	4/11/95	3
GDC	CGDCSB023	GDCSB02302	AS	0.33	MG/KG	U	4/11/95	3
GDC	CGDCSB034	GDCSB03402	AS	0.33	MG/KG	U	4/11/95	3

DEPARTMENT OF THE NAVY
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NAVAL FACILITIES ENGINEERING COMMAND
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2155 EAGLE DRIVE
NORTH CHARLESTON, S.C. 29419-9010

5090/11
Code 18713
23 Apr 01

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: SUBMITTAL OF AREA OF CONCERN 516 INTERIM COMPLETION REPORT

Dear Mr. Litton,

The purpose of this letter is to submit an Interim Measure Completion Report (Revision 0) for Area of Concern (AOC) 516, Building 233, Zone C located at the Charleston Naval Complex. The work plan is submitted to fulfill the requirements of condition IV.E.2 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency (EPA).

The document is distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate.

If you should have any questions, please contact, Matthew Humphrey or myself at (843) 743-9985 and (843) 820-5551 respectively.

Sincerely,

ROBERT A. HARRELL, JR., P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4)
USEPA (Dann Spariosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

Code 18 CIRC
18713
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18713
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CH2M HILL
3011 S.W. Williston Road
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CH2MHILL

April 20, 2001

John Litton, P.E.
Director
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Dear Mr. Litton:

Enclosed please find four copies of the Interim Measure Completion Report for Area of Concern 516, Building 233, Zone C, at the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

Please contact me if you have any questions or comments.

Sincerely,

Dean Williamson

Dean Williamson, P.E.

xc: Tony Hunt/Navy, w/att
Rob Harrell/Navy, w/att
Mihir Mehta/SCDHEC
Gary Foster/CH2M HILL, w/att

5090/11
Code 18B1
13 April 2001

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: SUBMITTAL OF AREA OF CONCERN 696 RCRA FACILITY INVESTIGATION ADDENDUM

Dear Mr. Litton,

The purpose of this letter is to submit the RCRA Facility Investigation Addendum for Area of Concern (AOC) 696, Zone K, located at Naval Station Annex in Charleston, SC. The addendum is submitted to fulfill the requirements of condition II.C.1 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency (EPA).

This document has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process and has been distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate.

If you should have any questions, please contact, Matthew Humphrey or myself at (843) 743-9985 and (843) 820-5551 respectively.

Sincerely,

ROBERT A. HARRELL, JR., P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4)
USEPA (Dann Spariosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

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D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

April 12, 2001 CERTIFIED MAIL

Matthew Humphrey
Caretaker Site Office
NAVFACENGCOM, Southern Division
P. O. Box 190010
North Charleston, SC 29419-9010

Re: Interim Measures Work Plan (Groundwater Investigation) for AOC 607 located in Zone F of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated March 2001, received March 29, 2001.

Dear Mr. Humphrey:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments for the most part do not change the scope of the proposed work but they need to be addressed prior to the approval of the future Six Phase Heating Interim Measures. Therefore, the Department is granting a conditional approval of the referenced Interim Measures Work Plan provided the Navy adequately addresses the stated comments.

Response to comments would suffice as the final documentation for the referenced work plan (i.e., revision to the referenced document will not be necessary).

The CNC should note that the Department's approval is based on the information provided to date. Any new information found to be contradictory may require further action.

Should you have any questions regarding this issue, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

David Scaturo, PE, PG
Manager, Corrective Action Engineering Section
Division of Waste Management
Bureau of Land & Waste Management

cc: Paul Bergstrand, Hydrogeology
Mansour Malik, Hydrogeology
Susan Peterson, Corrective Action Engineering
Rick Richter, Trident EQC
Rob Harrell, SOUTHDIV
Tony Hunt, SOUTHDIV
Dann Spariosu, EPA Region IV
Dean F. Williamson, CH2MHILL/JONES
BLWM File No. 50484

South Carolina Department of Health and Environmental Control comments on: Interim Measures Work Plan (Groundwater Investigation) for AOC 607 located in Zone F of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated March 2001, received March 29, 2001.

Comments by Mihir Mehta:

1. Section 2.0. Technical Approach. Page 2-1.
   Lines 11-16, indicate that groundwater well number 607GW022 had hits of VOCs greater that 2000 micrograms per liter. Please check the data to validate this result. It is the Departments understanding, based on the available data, that the VOC detected at this well is around 20-50 micrograms per liter. Please clarify.

2. Section 2.0. Technical Approach. Page 2-1.
   Lines 13, please clarify the notation of the well "166GW015". "166.." should be replaced with "607..". Please clarify.

3. Figure 2-1.
   Based on the proposed groundwater sampling locations (607GP071, 073, 075, and 076) there may be a likely scenario of groundwater contamination (DNAPL) underneath the building. This will be validated through the proposed sampling, but the Department would recommend that the Navy start evaluating potential alternatives if that were the case. This comment does not alter the scope of the work plan but a likely scenario that may be pose a challenge for the clean up strategy.

4. Phone call discussion dated April 2, 2001 between SCDHEC and Ch2MHILL.
   The Department discussed and identified the areas where extent of DNAPL contamination above the shallow clay layer has not been defined and the work plan does not propose sampling those areas. A figure of this area was faxed to CH2MHILL for discussion purposes. The Department understands that the goal of this investigation is to define the area of groundwater contamination that is target for future Six Phase Heating interim measures. In order to achieve the overall clean up goals in a timely manner, the Department recommends that the Six Phase Heating interim measures be deployed to address all of the DNAPL type groundwater contamination above the shallow clay layer at this site.

   The attached comments and the figure identify the Department concerns with the proposed investigation, but it is the Navy and CH2MHILL's decision what treatment train approach should be applied.

3. Figure 2-1. This figure indicates the AOC boundary is concurrent with the extent of building 1189. According to permit conditions I.D.1 and I.D.20, the Department has concluded that once contamination has been detected/Defined, the boundary of the SWMU or AOC encompasses the extent of that contamination beyond the original SWMU/AOC boundary. Because of the nature of this investigation, the submittal of revised figures is not requested, however the Navy should note this point.

4. It is not clear how the Navy will determine the extent of free product contamination under Building 225. The Department is available for discussion on this topic.

CH2M HILL
3011 S.W. Williston Road
Gainesville, FL
32608-3928
Mailing address:
P.O. Box 147009
Gainesville, FL
32614-7009
Tel 352.335.7991
Fax 352.335.2959

CH2MHILL

April 10, 2001

John Litton, P.E.
Director
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Dear Mr. Litton:

Enclosed please find four copies of the RCRA Facility Investigation (RFI) Addendum for Area of Concern 696, Zone K, at the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

Please contact me if you have any questions or comments.

Sincerely,

Dean Williamson, P.E.

xc: Tony Hunt/Navy, w/att
Rob Harrell/Navy, w/att
Mihir Mehta/SCDHEC
Gary Foster/CH2M HILL, w/att

PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

Memorandum

To: Corrective Action Engineering Section (DoD Staff)
RCRA Hydrogeology Team 1 (DoD Staff)
RCRA Hydrogeology Team 2 (DoD Staff)

Through: David Scaturo
Joe Bowers
Jack Gelting

From: Development Group (Stacey French, Susan Byrd, Tim Hornosky)

Date: April 10, 2001

RE: Process Memorandum for Screening Flowcharts

The attached process memorandum is not intended to be formal guidance, but rather an outline of the decision making process. It is intended for use by section staff when determining how to conduct soil, groundwater, and sediment screening, and risk assessments during the RCRA Corrective Action Process. The intent of the flowcharts is to provide a consistent approach for screening at military bases in the state.

SLF

Soil, Groundwater, Surface Water, and Sediment Screening and Human Health and Ecological Risk Screening during RCRA Corrective Action

**Note: This process memorandum is not guidance and should not be referenced as such.*

A. Purpose of Process Memorandum:

The attached flowcharts were developed in accordance with the SCDHEC Bureau of Land and Waste Management's Assessment and Remediation Criteria. The process outline should streamline both the delineation of the nature and extent of contamination and the risk assessment process. There are numerous scientific management decision points (SDMP) incorporated into the flowcharts in order to account for site-specific management decisions.

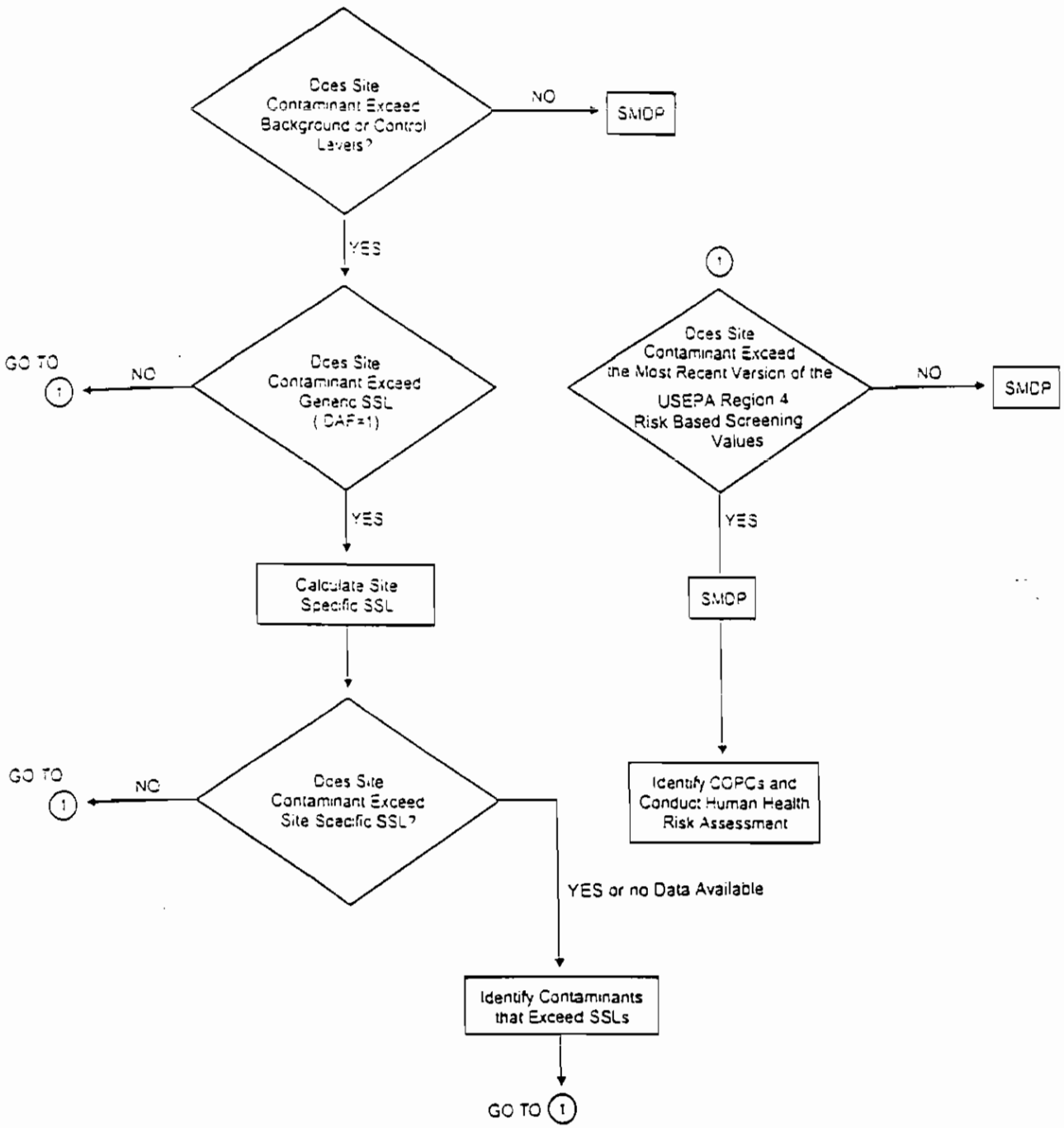
B. Definitions:

1. Background Levels: Facility-specific levels established for naturally occurring inorganic constituents. These levels are developed by statistical analysis of data collected from areas not affected by waste management activities. *The Department must approve the background levels prior to using them for screening.*

2. Control Levels: Facility-specific levels established for non-naturally occurring levels of hazardous constituents. This term is commonly referred to as "anthropogenic background". The data set is established to control for a specific influence or influences. A common example is: a control data set for urban contamination (road/parking lot runoff). The control levels are developed in the same manner as the background levels. *As with background levels, the Department must approve the control levels prior to using them for screening.*

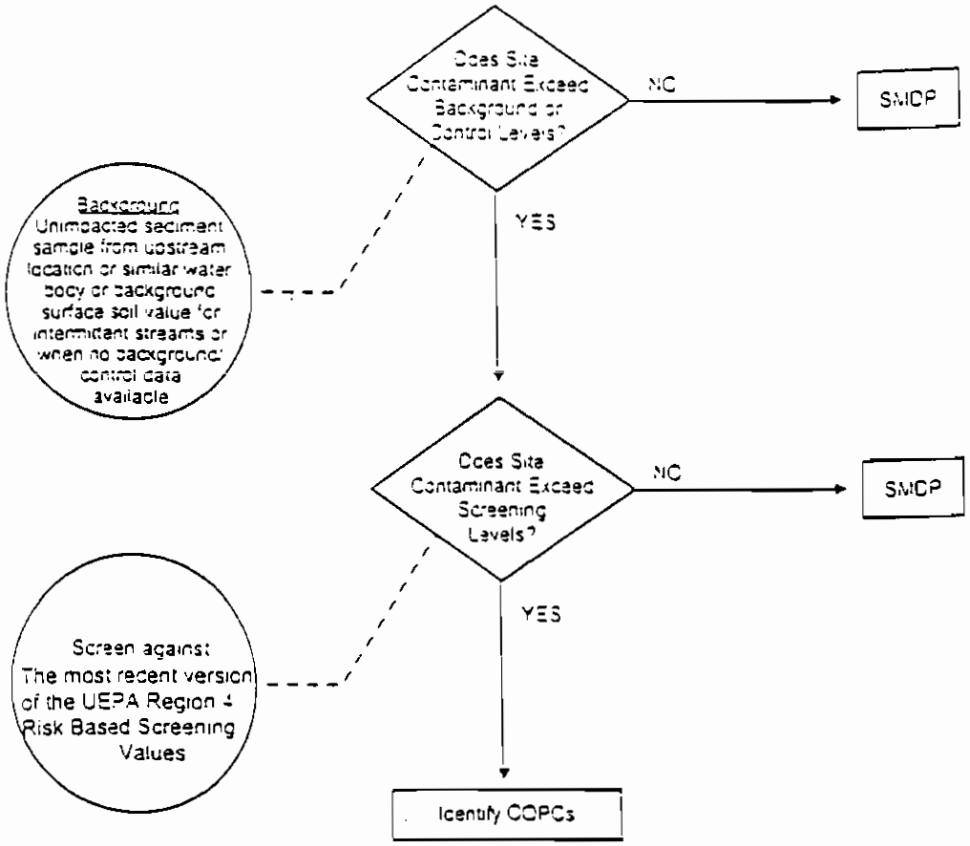
3. Scientific management decision point (SMDP): A point at which the project manager assesses the cumulative information to determine the next course of action. This information should include but not be limited to the history of the area in question, whether the nature and extent of contamination has been fully delineated, and future use of the unit. Some examples of possible decisions are the need for further delineation, NFA, etc.

4. Soil Screening Levels (SSLs): Generic USEPA Soil Screening Levels or calculated site-specific soil screening levels.



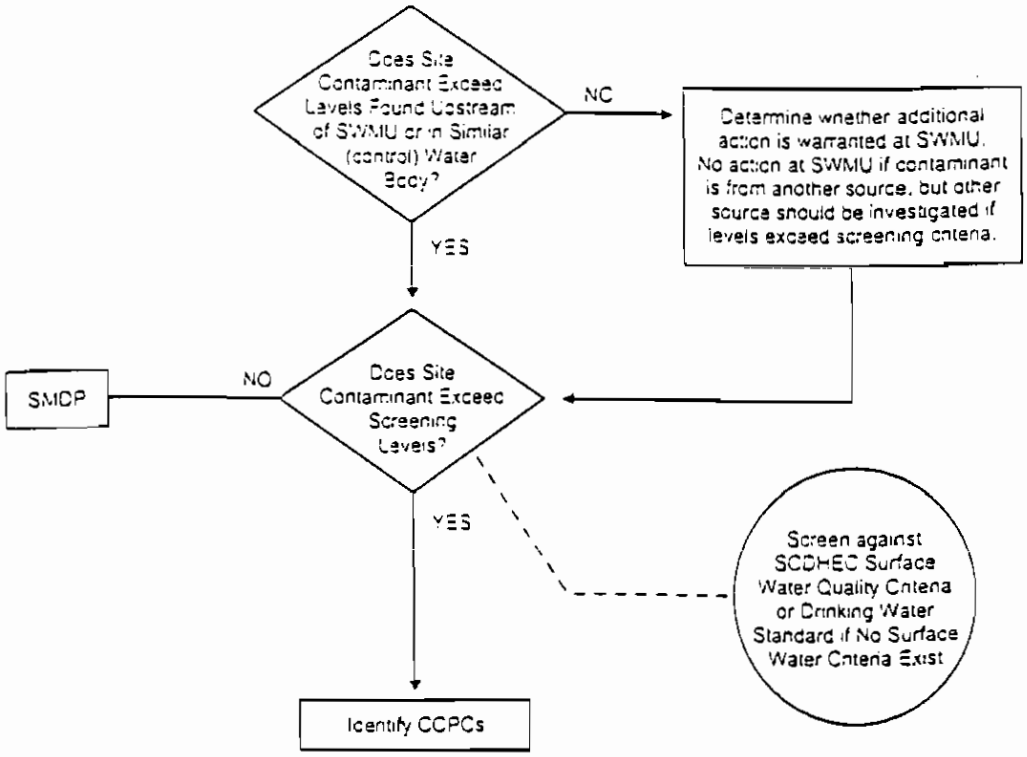
COPC = Chemical of Potential Concern
DAF = Dilution-Attenuation Factor
EPA = Environmental Protection Agency
NFA = No Further Action
RBC = Risk-Based Concentration
SSL = Soil Screening Level
SMDP = Scientific Management Decision Point, can include NFA, more samples, etc

SOIL SCREENING



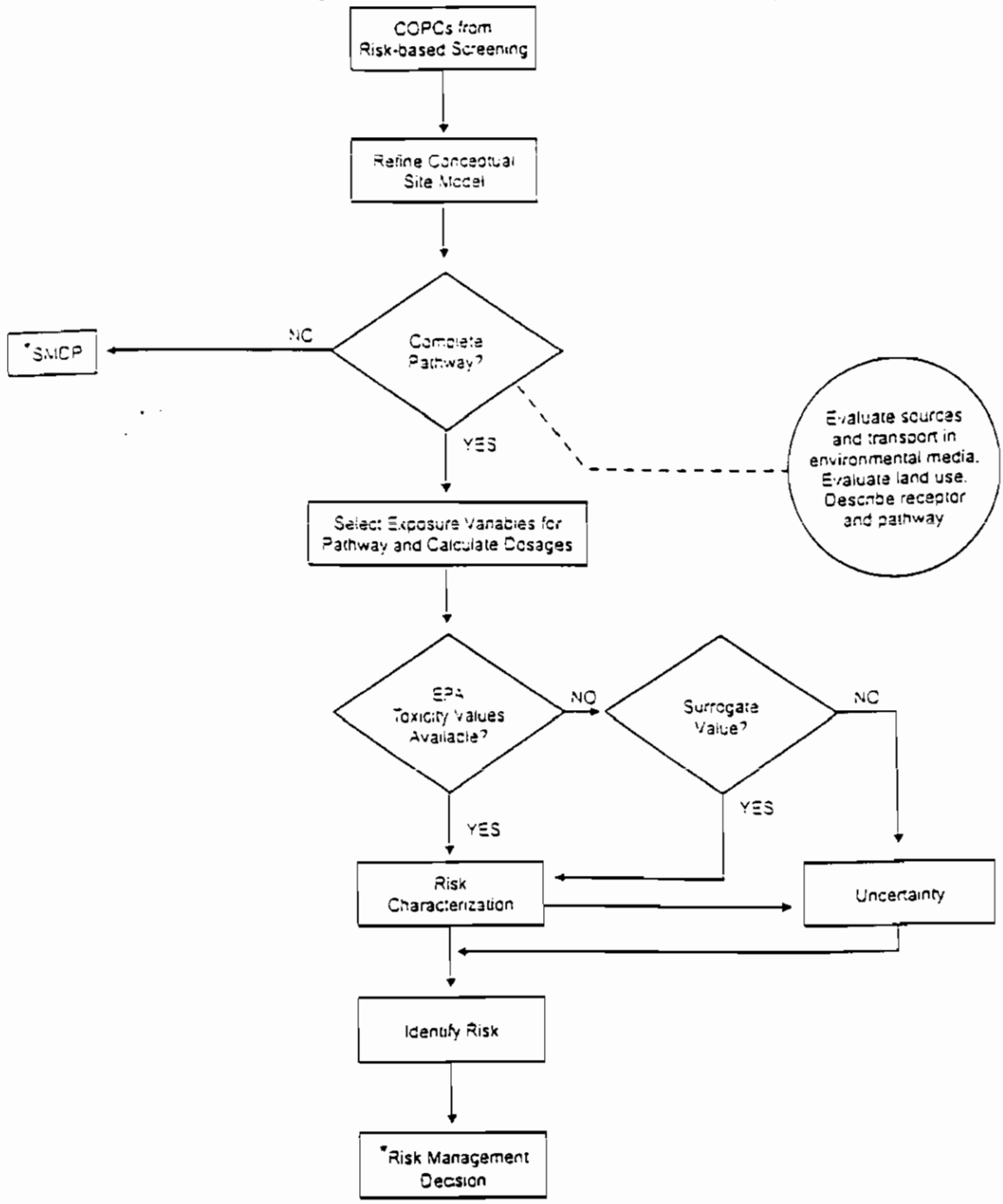
COPC = Chemical of Potential Concern
EPA = Environmental Protection Agency
LTM = Long-Term Monitoring
NFA = No Further Action
RBC = Risk-Based Concentration
SMDP = Scientific Management Decision Point, can include NFA, more samples, etc

SEDIMENT SCREENING



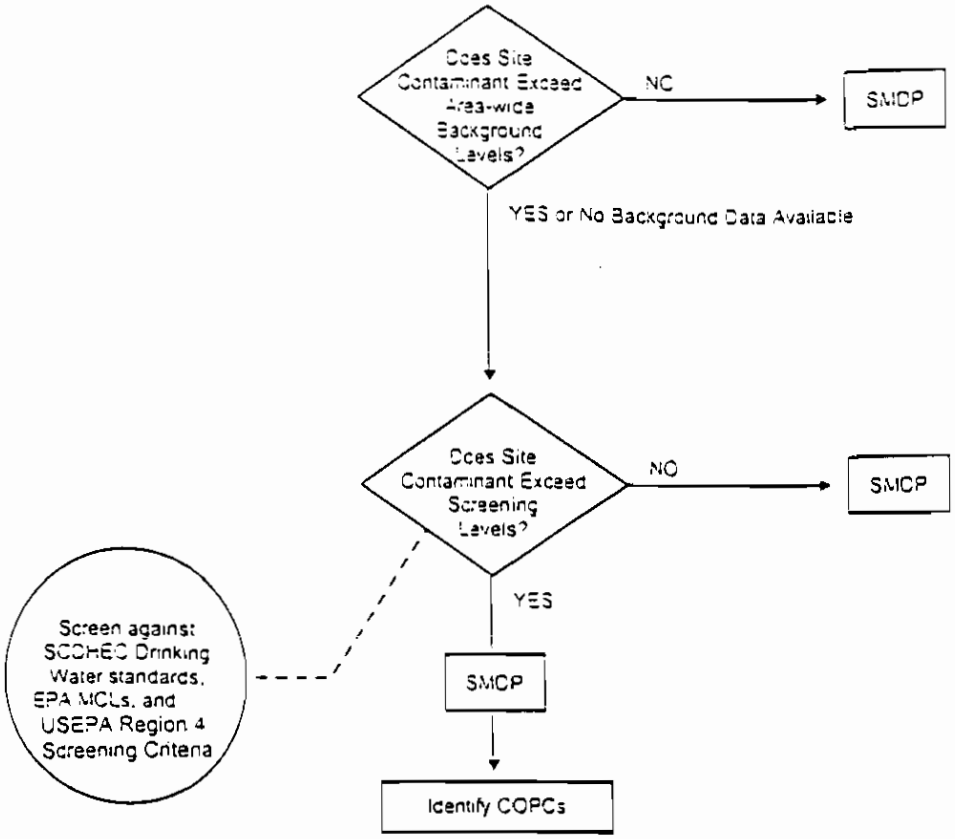
COPC = Chemical of Potential Concern
NFA = No Further Action
SCDHEC = South Carolina Department of Health and Environmental Control
SWMU = Solid Waste Management Unit
SMDP = Scientific Management Decision Point, can include NFA, more samples, etc.

SURFACE WATER SCREENING



COPC = Chemical of Potential Concern
EPA = Environmental Protection Agency
NFA = No Further Action
SMCP = Scientific Management Decision Point
* = Could include NFA, CMS, Presumptive Remedy

HUMAN HEALTH RISK ASSESSMENT PROCEDURE



COPC = Chemical of Potential Concern
EPA = Environmental Protection Agency
MCL = Maximum Contaminant Level
NFA = No Further Action
RBC = Risk-Based Concentration
SCDHEC = South Carolina Department of Health and Environmental Control
SMDP = Scientific Management Decision Point, can include NFA, more samples, etc.

GROUNDWATER SCREENING

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, S.C. 29419-9010

5090/11
Code 18713
9 Apr 01

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: RCRA FACILITY ASSESSMENT FOR AREAS OF CONCERN 720

Dear Mr. Litton:

The purpose of this letter is to provide an Addendum to the RCRA Facility Assessment (RFA) for Area of Concern (AOC) 720, which is associated with Oil/Water Separators and Waste Oil Tanks at the Charleston Naval Complex. The RFA is required by condition IV.E.2 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency(EPA).

The AOCs identified under this RFA are:

Site	Description	Investigation Zone
AOC 720	Oil/Water Separator at Building X12	G

The investigative approach (i.e. NFA, RFI, CSI, etc.) is provided in the recommendations for each site. The Navy has previously submitted a draft of this RFA and has discussed comments and responses with Department staff. The Navy requests that the Department and the EPA review this document to ensure the changes are consistent with the resolution discussed previously and provide approval.

Additionally, responses to DHEC comments provided by, Mr. Mihir Mehta, are included. The Navy's response to, Mr. Mehta's comments was not included in the Navy's 23 February 2001 letter.

Subj: RCRA FACILITY ASSESSMENT FOR AREAS OF CONCERN 720

If you should have any questions, please contact, Matthew Humphrey or myself at (843) 743-9985 and (843) 820-5551 respectively.

Sincerely,

ROBERT A. HARRELL, Jr., P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4)
USEPA (Dann Spariosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, S.C. 29419-9010

5090/11
Code 18713
9 Apr 01

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: OIL/WATER SEPARATOR DATA

Dear Mr. Litton:

The Naval is forwarding Oil/Water Separator (OWS) data. The data is to assist DHEC in determining the location and operation of the OWS on the Charleston Naval Complex (CNC). The document is meant as an aid in reviewing and understand future submittal. The document is not meant to meet any define regulatory requirement. This is a formal submittal of the document informally sent to DHEC is September 2000.

If you should have any questions, please contact me at (843) 743-9985 and (843) 820-5551 respectively.

Sincerely,

ROBERT A. HARRELL, JR., P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4)
USEPA (Dann Spariosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, S.C. 29419-9010

5090/11
Code 18B1
6 APR 01

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: SUBMITTAL OF AREA OF CONCERN 518 INTERIM MEASURE WORK PLAN

Dear Mr. Litton,

The purpose of this letter is to submit an Interim Measure Work Plan (Revision 0) for Area of Concern (AOC) 518, Coal Storage Bins, Zone C, located at the Charleston Naval Complex. The work plan is submitted to fulfill the requirements of condition IV.E.2 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency (EPA).

The document is distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate.

If you should have any questions, please contact, Matthew Humphrey or, myself at (843) 743-9985 and (843) 820-5551 respectively.

Sincerely,

ROBERT A. HARRELL, JR., P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4)
USEPA (Dann Spariosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, S.C. 29419-9010

5090/11
Code 18B1
6 Apr 01

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: SUBMITTAL OF AREA OF CONCERN 634 RCRA FACILITY INVESTIGATION WORK PLAN ADDENDUM

Dear Mr. Litton,

The purpose of this letter is to submit the RCRA Facility Investigation Work Plan Addendum (Revision 0) for Area of Concern (AOC) 634, Zone G, located at Charleston Naval Complex in Charleston, SC. The work plan addendum is submitted to fulfill the requirements of condition II.C.1 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency (EPA).

This document has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process and has been distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate.

If you should have any questions, please contact, Matthew Humphrey or myself at (843) 743-9985 and (843) 820-5551 respectively.

Sincerely,

ROBERT A. HARRELL, JR., P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4)
USEPA (Dann Spariosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

Received 4/6/01

CH2M HILL
3011 S.W. Williston Road
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32608-3928
Mailing address:
P.O. Box 147009
Gainesville, FL
32614-7009
Tel 352.335.7991
Fax 352.335.2959

CH2MHILL

April 4, 2001

John Litton, P.E.
Director
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Dear Mr. Litton:

Enclosed please find four copies of the RCRA Facility Investigation (RFI) Addendum for Area of Concern 634, Zone G, at the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

Please contact me if you have any questions or comments.

Sincerely,

Dean Williamson

Dean Williamson, P.E.

xc: Tony Hunt/Navy, w/att
Rob Harrell/Navy, w/att
Mihir Mehta/SCDHEC
Gary Foster/CH2M HILL, w/att

D H E C

PROMOTE PROTECT PROSPER

April 4, 2001

Matthew Humphrey
Caretaker Site Office
NAVFACENGCOM, Southern Division
P. O. Box 190010
North Charleston, SC 29419-9010

Re: Interim Measures Work Plan for SWMU 42 and AOC 50 located in Zone A of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated January 2001, received January 26, 2001

Dear Mr. Humphrey:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced document according to applicable State and Federal Regulations, and the Charleston Naval Complex Hazardous Waste Permit, effective September 17, 1998. The attached comments were generated based on this review. These comments do not appear to alter the proposed field excavation activities and therefore, the Department is granting the conditional approval for the Navy to initiate field implementation for the proposed work. The Department believes that granting the conditional approval will expedite the clean up activities. However, the referenced document and especially groundwater conclusions presented should not be considered a part of this approval

Further, the CNC should submit, to the Department, the draft comment responses to address these comments within thirty (30) calendar days of the receipt of this letter.

Should you have any questions regarding these comments, please contact Mihir Mehta at (803) 896-4088 or Paul Bergstrand at (803) 896-4016.

Sincerely,

David Scaturo

David Scaturo, PE, PG
Manager, Corrective Action Engineering Section
Division of Waste Management
Bureau of Land & Waste Management

Attachments: Memorandum from Paul Bergstrand to Mihir Mehta dated March 29, 2001.

cc: Paul Bergstrand, Hydrogeology
Rick Richter, Trident EQC
Rob Harrell, SOUTHDIV
Tony Hunt, SOUTHDIV
Dann Spariosu, EPA Region IV
Dean F. Williamson, CH2MHILL/JONES
Gary Foster, CH2MHILL/JONES
BLWM File No. 50484

South Carolina Department of Health and Environmental Control comments on: Interim Measures Work Plan for SWMU 42 and AOC 505 located in Zone A of the Charleston Naval Complex, SCO 170 022 560, Revision 0, dated January 2001, received January 26, 2001.

Comments by Mihir Mehta:

1. The stated comments were briefly discussed, via phone call, between Paul Favara (CH2MHILL) and Mihir Mehta (SCDHEC) on March 8, 2001. This was beneficial in clarifying minor issues and also gave a head start for resolving the comments. In general, the referenced document was suitably written in meeting the goals and expectations of the contents of interim measures work plan.

2. Section 2.1.3. Surface Soil. Page 2-3.
   Line 26 indicates soil sample locations indicating elevated levels for Lead. It would be beneficial if these locations can be identified on one of the figures in this section. There are other sub-sections that reference the locations but are not shown on the figures. Indicating the sample locations on the figures would facilitate the review and would enable the Department to understand the rational presented in the document.

3. Section 2.1.3. Subsurface Soil. Page 2-5.
   Lines 11-24 discuss the rational for why Arsenic above SSLs should not be considered for further action. Please elaborate this portion of the text to address the following concerns:

   - The SSL were calculated using generic DAF. What would be the difference between the SSL values if site-specific DAF were used instead of generic DAF. Will the difference affect the proposed recommendation?
   - Specify which locations had hits above the SSL in the text and on the Figure 2-2.
   - Indicate the groundwater well used in supporting the no further action recommendation.

4. Section 2.1.3. Groundwater. Page 2-5.
   Lines 26-29 discuss the screening of surface soils data against Region III RBCs. It appears that this was an oversight and the discussion should be focused on groundwater screening and not on surface soil screening. Please revise accordingly.

5. Section 2.1.3. Groundwater. Page 2-5.
   It might be beneficial to provide a figure that indicates the groundwater wells, groundwater flow direction, and other relevant information to support the no further corrective action recommendation for groundwater. Recognizing that the RFI Report recommends CMS for groundwater contamination and the referenced document provides the rational why this recommendation is not appropriate. Please revise the document accordingly.

6. Section 3.6.1. Excavation. Page 3-4.
Lines 19-27, discusses the confirmation sampling strategy for the proposed excavation. It states that the samples will be taken approximately every 50 linear feet of the excavation perimeter. Figure 3-4 indicated that excavation area 5 and 6 has perimeter of approximately 84.98 and 70.06 ft respectively. Based on the confirmation sampling strategy it appears for these two areas only one confirmation sample will be obtained. This may not be sufficient to show that the extent of contamination (and interim measure goal) has been excavated in all directions. Please revise the confirmation sampling strategy to address this concern.

7. Figure 3-3 and Figure 3-4.
Figure 3-3 illustrates the proposed excavation area with respect to BEQ data. Figure 3-4 illustrates the excavation areas for these interim measures work plan. The Department has question with the delineation of proposed excavation area 4, 6, and 9. Figure 3-3 shows that these areas have been surrounded by sample locations with BEQ levels below the background levels, but the proposed area on excavation does not encompass the entire area above background. The text on page 3-1 indicates that two-dimensional Kriging was performed to estimate the area of surface soils requiring cleanup. The proposed goal is to cleanup this site to established background values. Please provide an explanation of how these areas were estimated.

The discussion with Dean Williamson (CH2MHILL) during the CNC team meeting on March 13, 2001 helped understand the process for developing excavation areas. Based on the discussion additional information within the referenced document would be helpful in understanding the development of proposed excavation areas. Please revise the document accordingly.

8. Throughout the referenced document the MCL for arsenic is noted as 10 ppb. Please note that the current promulgated MCL for arsenic is 50ppb and not 10 ppb. Please make necessary revisions.

D H E C
PROMOTE PROTECT PROSPER
2600 Bull Street
Columbia, SC 29201-1708

MEMORANDUM

TO: Mihir Mehta, Environmental Engineer Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

FROM: Paul M. Bergstrand, P.G., Hydrogeologist
RCRA Hydrogeology Section
Division of Hydrogeology
Bureau of Land and Waste Management

DATE: 3 April 2001

RE: Charleston Naval Base (CNAV)
Charleston County, South Carolina
SC0-170-022-560

RCRA Interim Measures Workplan
Solid Waste Management Area 42, Zone A
Revision 0, Dated 23 January 2001

The materials referenced above have been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency's (EPA) RCRA Facility Investigation Guidance Document dated May 1989, the EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994.

The RCRA Interim Measures Workplan is satisfactory for soil excavation to proceed, however the conclusion that the site can be used for unrestricted land use following the completion of the IM is premature and should not be considered as part of the approval. The following comments are a result of the document review.

COMMENTS

RCRA IM Workplan

Paul M. Bergstrand
3 April 2001

GENERAL COMMENTS

1. The Department provided the Navy a reply to the Response to Comments on 29 January 1999 for the Zone A RFI Report. Those comments were made relying on data to be collected during the Zone A CMS workplan and state, in part, "*Because SWMU 39 and SWMU42/505 is being addressed in the CMS, further efforts to evaluate soil and monitoring well data in the RFI will not be pursued.*" The Department also provided comments on the Draft Zone A CMS workplan on 13 July 1998 and replied to the Response to Comments on 15 March 1999. This new CMS data was intended to refine the nature and extent of contamination at this and other Zone A AOCs and SWMUs. That CMS Workplan has reportedly been implemented, however it is not clear if the results have ever been submitted to the Department or included in this document. Not having those results or resolution of the Department's CMS comments makes the conclusion of this IM that *"the site can be used for unrestricted land use following the completion of the IM"* highly questionable. New or unsubmitted data used to develop this workplan should be provided to the Department as soon as possible.

2. The Department recently received new information which may improve our understanding of SWMU 42 and AOC 505 and in turn may impact the current interpretation of data. Primarily, the concern is that the groundwater sample locations at SWMU 42/505 were not adequate to assess the actual SWMU location. This concern is based upon the following points:

   - The 6 June 1995 RFA states in part "*Since the unit (SWMU 42) was taken out of service in the early 1960s, little information was obtained about the dimensions, design features, operating practices, or waste disposal methods.*" And "*Primary materials associated with this unit are waste asphalt products, solvents, and degreasers.*" RFI workplan SWMU boundaries and soil and groundwater sample locations were based on limited information provided in the RFA.

- The Department replied to the Response to Comments on 29 January 1999 for the Zone A RFI Report. Those comments were made relying on data to be collected during the Zone A CMS workplan and state, in part, "*Because SWMU 39 and SWMU42/505 is being addressed in the CMS, further efforts to evaluate soil and monitoring well data in the RFI will not be pursued.*"

- It is not clear if the Ensafe CMS workplan has been implemented, nor is it clear that the results of that CMS workplan have ever been submitted to the Department or included in this document.

- The Department recently received maps of the Charleston Naval Base dated January 1962 and June 1947. These maps indicate that the SWMU 42 Asphalt Plant may be in a location different from the site that is depicted in the RFA or RFI. This information, when coupled with site groundwater elevation contour maps, indicates that the shallow RFI monitoring wells may be up gradient or side gradient of the site they were intended to assess. Copies of the relevant maps with the current monitoring wells drawn in and Figures of groundwater elevations are provided with these comments.

- The Naval Detachment provided a set of air photos taken before 1980. These air photos indicate that AOC 505 may encompass a much larger area than previously thought. The air photos also indicate that items other than railroad ties and ballast may have been stored in this area. The Navy needs to evaluate and discuss the adequacy of sample locations and the type of analysis performed in light of this information. A copy of one of the air photos of 42/505 has been provided with these comments.

- Lithologic cross sections of Zone A provided in the Ensafe CMS portray the area of 42/505 as primarily a sandy aquifer. The Section reportedly has five feet of surface Fill (a variable mixture of clays, silt, sand, gravel and ROC), nine feet of Qc; Quaternary Clayey Sand and Silty Sand (Aquifer) and an estimated thirty or more feet of Qs; Quaternary Sand (Aquifer). Chlorinated solvents, being denser than groundwater, have the ability to migrate downwards through the sandy aquifer. All wells in the 42/505 area are shallow and could miss a rapidly sinking contaminant. A copy of the relevant cross section has been provided with these comments.

- The shallow monitoring wells 042001 and 505001 reported low ppb detections of chlorinated solvents in excess of RBCs and/or MCLs. It is not clear whether these shallow groundwater detections are the edge of a larger and deeper downgradient contaminant plume. Copies of the Groundwater Elevation Contours from the Ensafe CMS Workplan are provided with these comments.

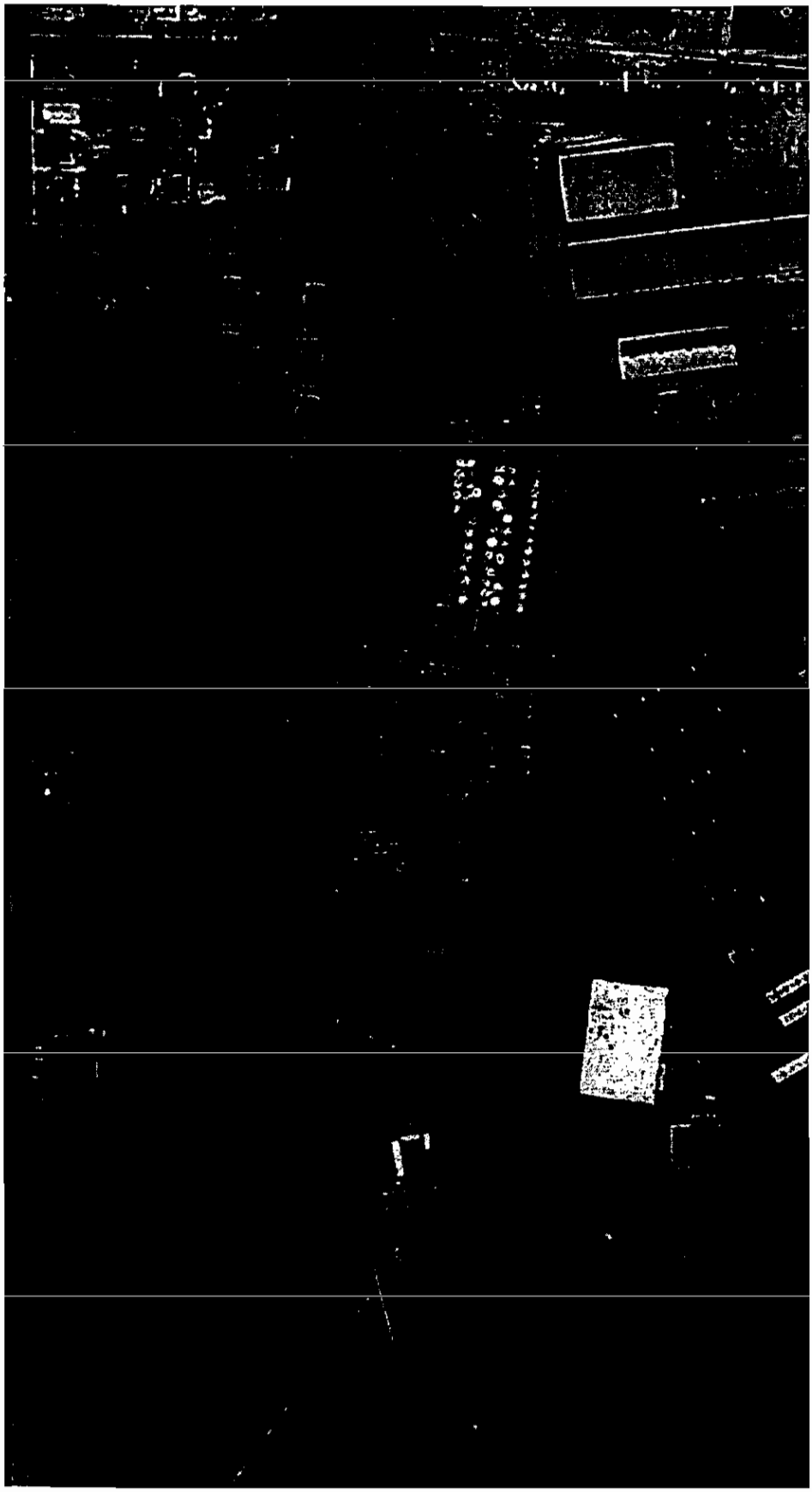
MONITORING WELL 042001

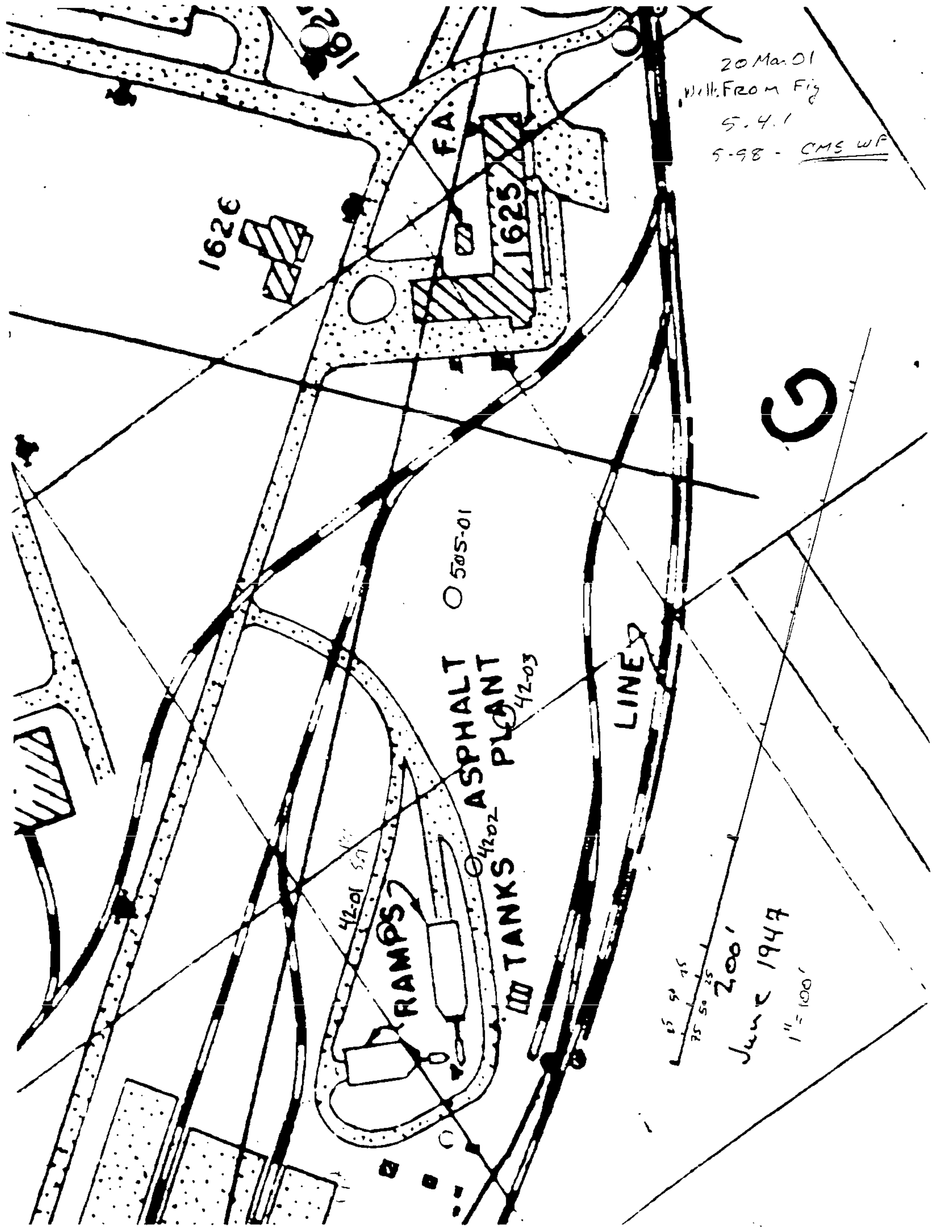
ORGANICS in Groundwater	12-95	4-96	6-96	10-96	*RBC*	*MCL*
Chloromethane	**7.8**	ND	ND	ND	*2.10*	*NL*
Trichloroethene	ND	1.4	**1.6**	ND	*1.6*	*5.0*
Tetrachloroethene	**5.9**	1.5	1.4	ND	*1.10*	*5.0*

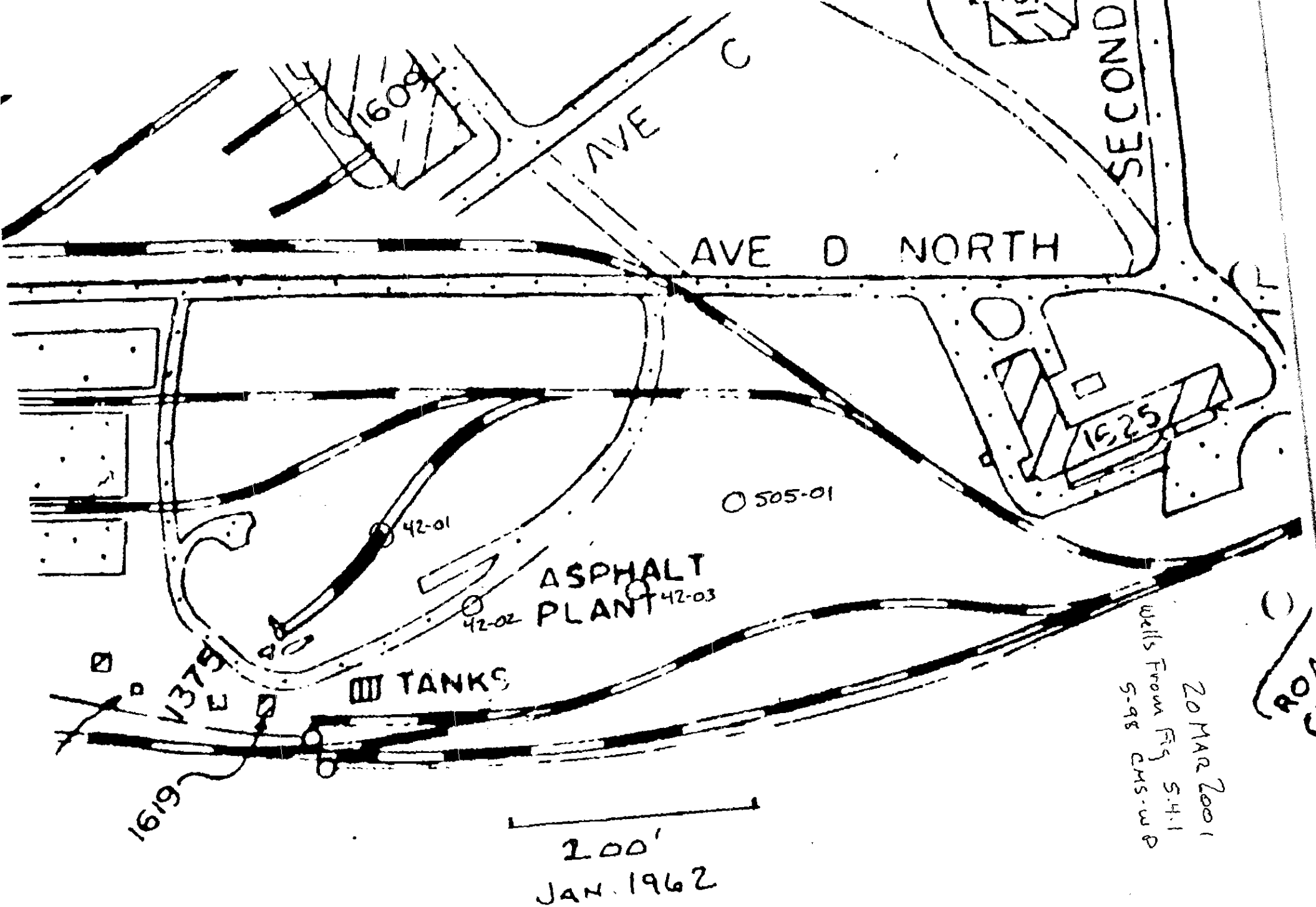
MONITORING WELL 505001

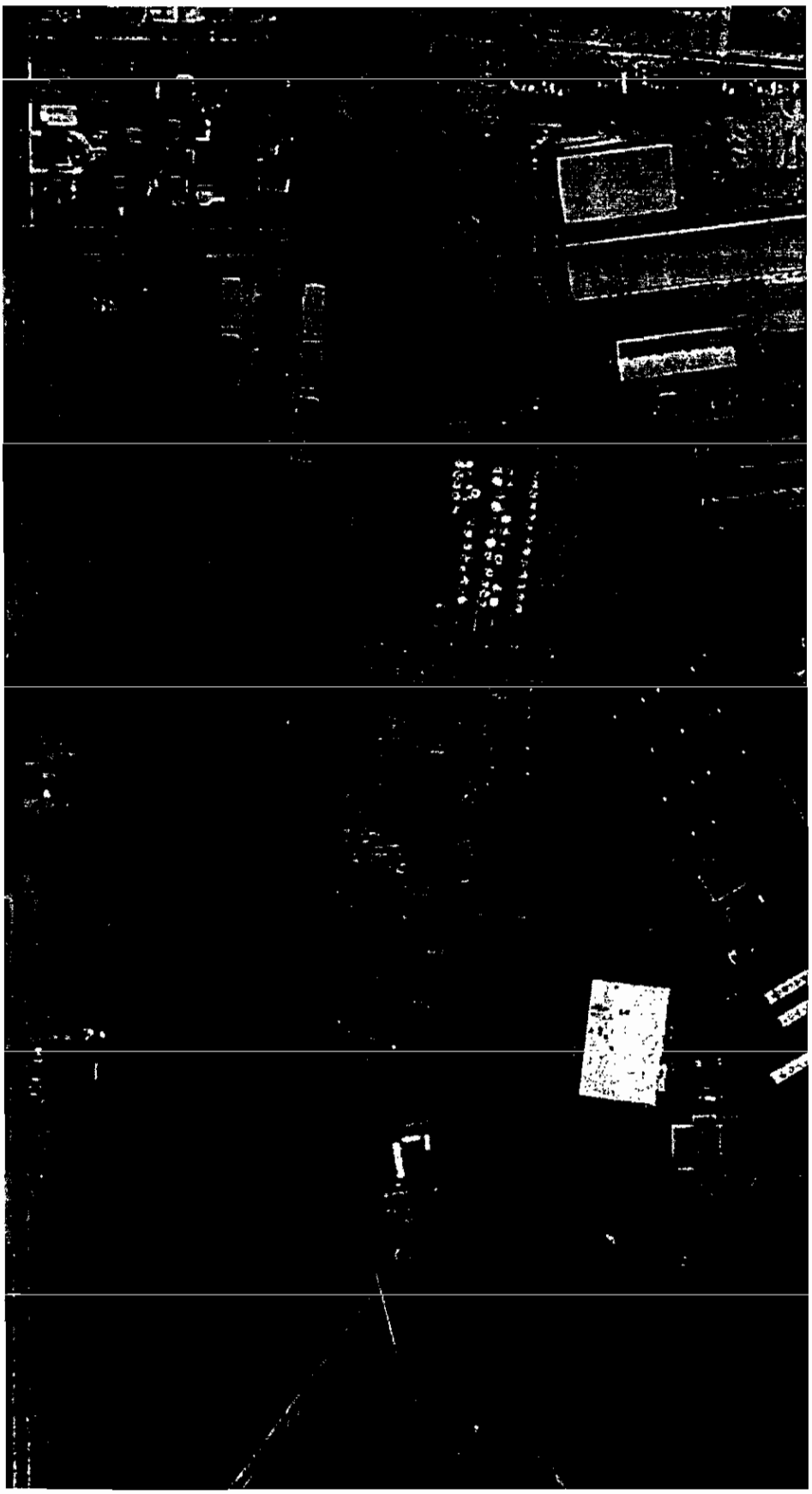
ORGANICS in Groundwater	12-95	4-96	6-96	10-96	*RBC*	*MCL*
Chlorobenzene	1.3	ND	ND	ND	*3.90*	*100*
1,1-Dichloroethene	**1.00**	ND	ND	ND	*0.04*	*7.0*
Ethylbenzene	1.2	ND	ND	ND	*130.0*	*700*
1,1,2,2-Tetrachloroethane	**1.5**	ND	ND	ND	*0.05*	*NL*
M+P Xylene	3.5	ND	ND	NS	*NA*	*NL*
O Xylene	1.4	ND	ND	NS	*140*	*10,000*
1,3 Dichlorobenzene	1.8	ND	ND	NS	*54*	*600*
1,2 Dichlorobenzene	1.8	ND	ND	NS	*27*	
1,4 Dichlorobenzene	**2.0**	ND	ND	NS	*0.44*	*75*

3. The Department's concern is that RFI sample locations were not adequate to asses the SWMU and AOC in question. Additional groundwater assessment, including monitoring wells appear to be necessary to complete the assessment of groundwater at this site. Please note, the Department is not suggesting that groundwater corrective action is warranted at this time. However, the Department cannot concur with eliminating groundwater as a medium of concern based on the documentation at hand. The Department will be available to review and discuss this information with the Navy.




20 Mar 01
Well From Fig
5.4.1
5-98 - CMS WP
FA
1625
162E
505-01
ASPHALT
PLANT
42-03
42-02
42-01
TANKS
RAMPS
LINE
200'
June 1947
1" = 100'


1609
AVE C
SECOND
AVE D NORTH
1625
505-01
42-01
ASPHALT
PLANT
42-03
42-02
TANKS
1375
1619
200'
JAN. 1962
20 MAR 2001
Wells From Fig 5.4-1
5-98 CMS-WP



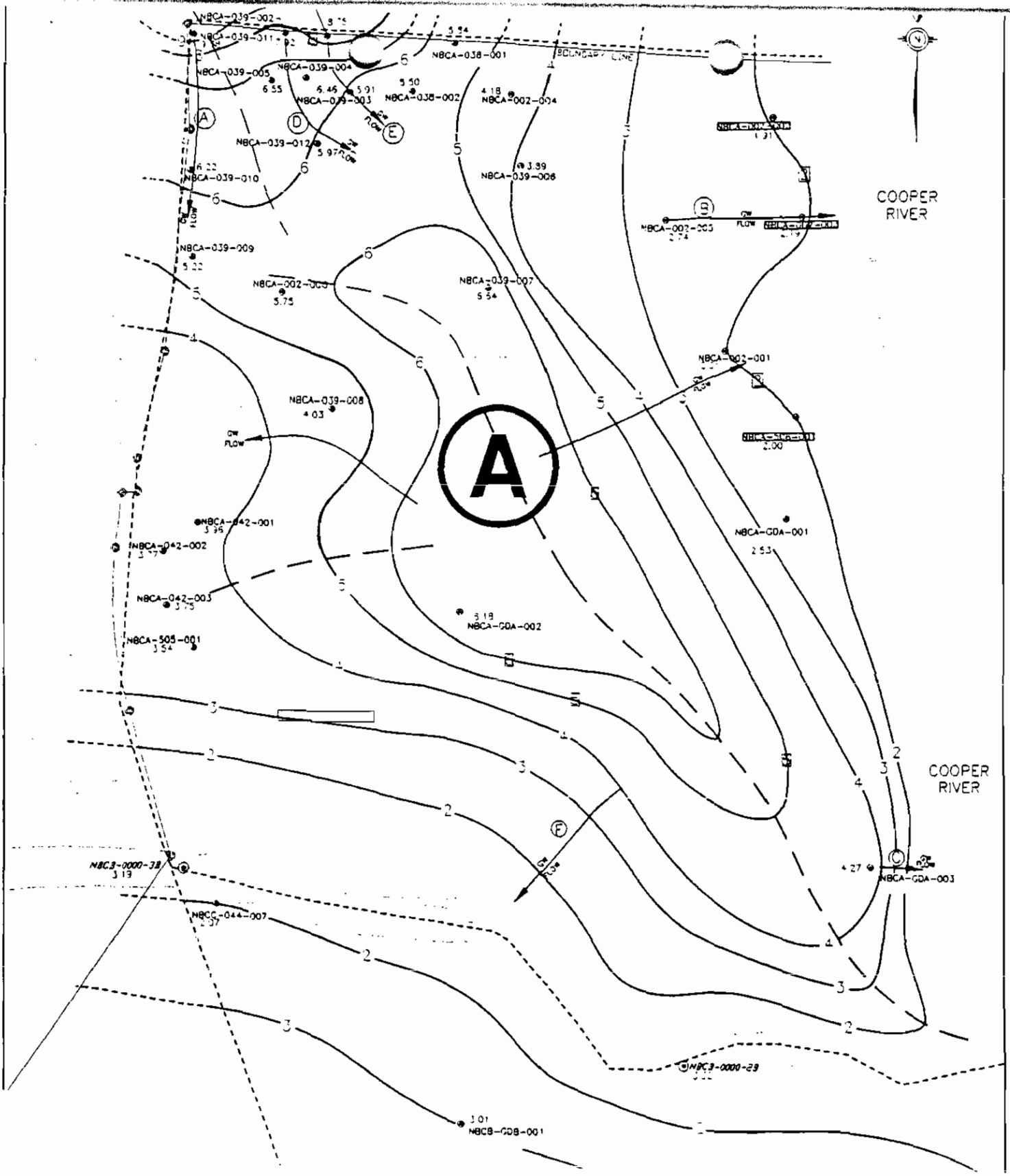


Figure 5.1 - Shallow Wells
High Tide 8-7-96
CMS WP
Ensafe

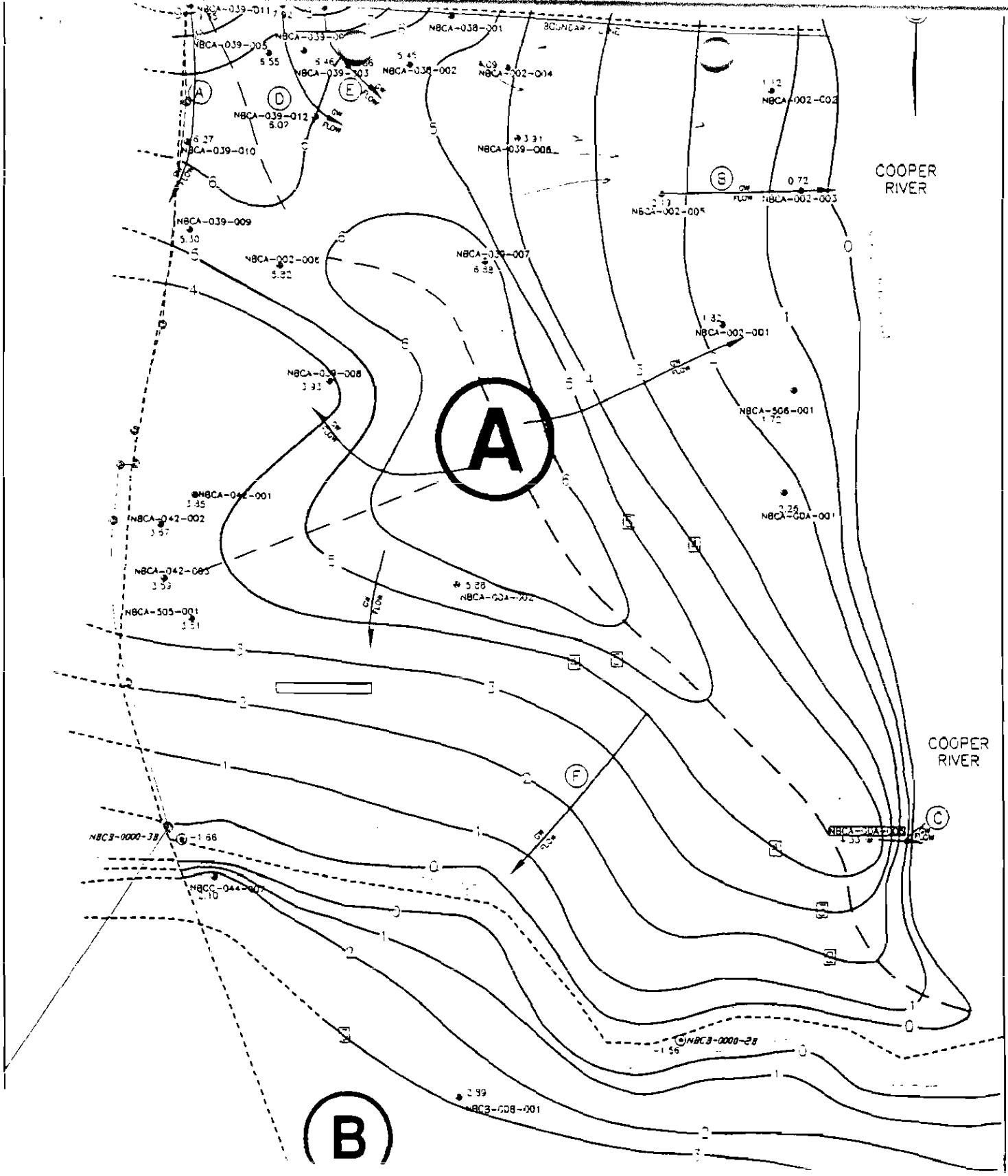


Figure S.H - Shallow Wells
Low Tide 8-7-96
CMS WP
Ensafe

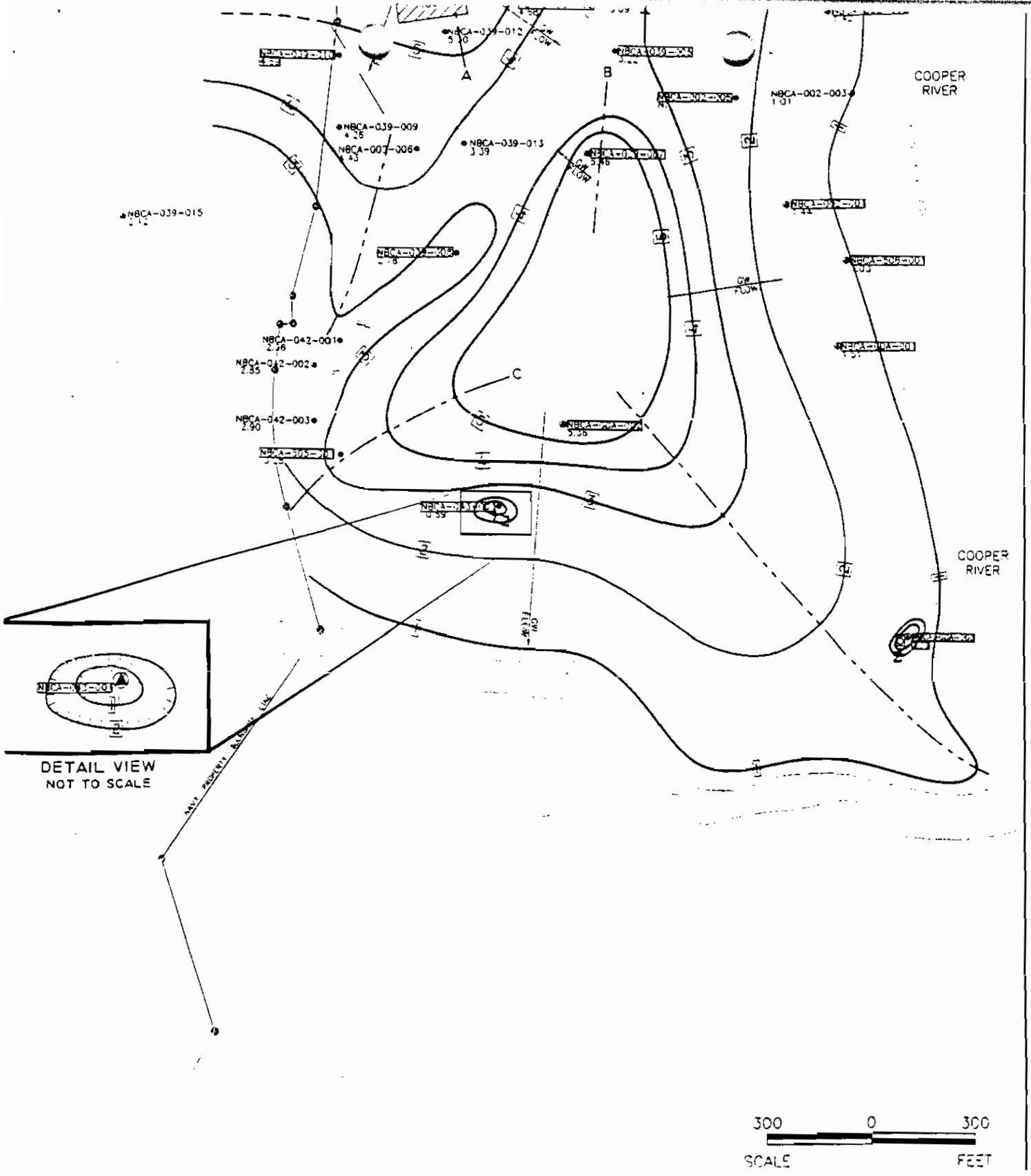


Figure 5.L Shallow Wells

Jan 22, 97

CMS WP

Ensafe

WEST
D

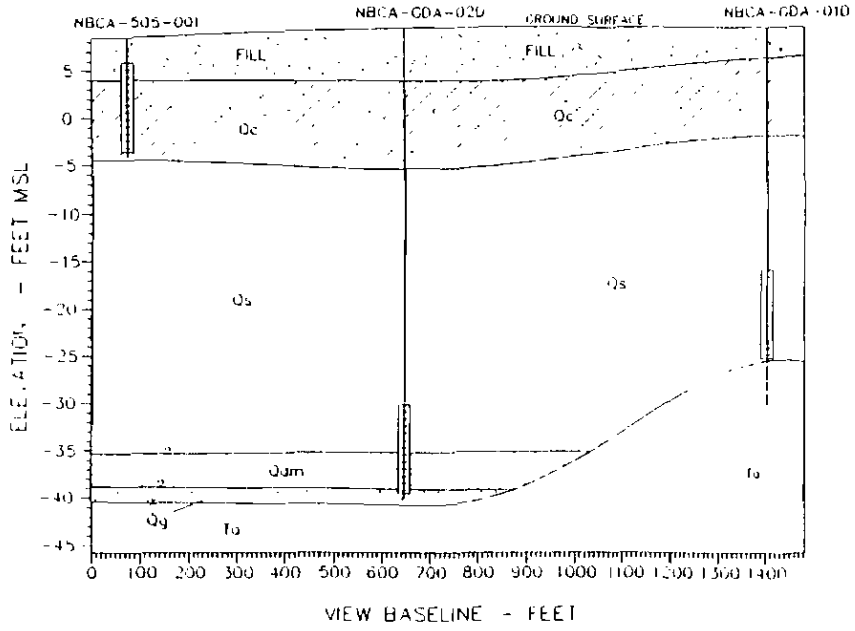
EAST
D'

42/505

B--B'

C--C'

COOPER RIVER



FILL	Undifferentiated mixture of medium to high plasticity clays, fine sand, silt, gravel and MOC. Varies ...tly with location
Qp	QUATERNARY PEAT--brown, silty, trace very ...and grasses and fibrous woody pieces, soft
Qc	QUATERNARY CLAYEY SAND AND SILTY SAND--brown, orange-brown, gray, green, and tan, very fine to fine sand often with trace medium grains, varying amounts of silt and inorganic gray clay, often interbedded with medium plasticity, soft gray clay laminae, sand occasionally unconsolidated and loose AQUIFER
Qm	QUATERNARY MARSH CLAY--dark gray to black, silty, high organic content, with brown grasses and occasional peat, very soft, low plasticity, sticky, occasionally interbedded with very fine to fine sand laminae and pods AQUITARD
Qs	QUATERNARY SAND--undifferentiated olive-brown,gray, and orange sand, primarily very fine to fine and moderately to well-sorted but typically increases in grain size with depth (from fine to medium with some coarse), clean to silty sand AQUIFER
Qdm	QUATERNARY DEWATERED MARSH CLAY--dark green to dark gray, silty, high plasticity, firm to stiff, clay, occasionally very fine sand present in very thin laminae and pods AQUITARD
Qg	QUATERNARY GRAVEL--gray to dark gray, typically grain-supported subrounded phosphate pebbles up to 2 cm in size and fine to coarse shell hash, ...and clayey fine to coarse sand matrix AQUIFER
Tmh	TERTIARY MARLS HEAD FORMATION--olive-gray to gray-green silt with varying amounts of very fine to fine quartz and phosphate sand with some clay, low plasticity, soft, intermixed with small subrounded phosphate pebbles, coarse shell hash and oyster shells
Ta	TERTIARY ASHLEY FORMATION--olive-green to olive-brown silt with varying amounts of clay and very fine sand, medium plasticity, firm to stiff, trace calcareous CONFINING UNIT

LEGEND

- WELL SCREEN INTERVAL NOT INCLUDING FILTERPACK
- CROSS SECTION INTERSECTION
- ? - GEOLOGIC CONTACT INFERRED

ZONE A RCRA CMS
WORK PLAN
NAVAL BASE CHARLESTON
CHARLESTON, S.C.

FIGURE 5.6
LITHOLOGIC CROSS SECTION
D - D'

DWG. DATE 06/04/98 | DWG. NAME 2901G15

MEMORANDUM

TO: Mihir Mehta, Environmental Engineer Associate
Corrective Action Engineering Section
Division of Waste Management
Bureau of Land and Waste Management

FROM: Paul M. Bergstrand, P.G., Hydrogeologist
RCRA Hydrogeology Section
Division of Hydrogeology
Bureau of Land and Waste Management

DATE: 3 April 2001

RE: Charleston Naval Base (CNAV)
Charleston County, South Carolina
SC0-170-022-560

RCRA Interim Measures Workplan
Solid Waste Management Area 42, Zone A
Revision 0, Dated 23 January 2001

The materials referenced above have been reviewed with respect to the requirements of R.61-79 of the South Carolina Hazardous Waste Management Regulations, The Environmental Protection Agency=s (EPA) RCRA Facility Investigation Guidance Document dated May 1989, the EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) dated May 1996, the CNAV Final Comprehensive Sampling and Analysis Plan dated 30 August 1994.

The RCRA Interim Measures Workplan is satisfactory for soil excavation to proceed, however the conclusion that the site can be used for unrestricted land use following the completion of the IM is premature and should not be considered as part of the approval. The following comments are a result of the document review.

COMMENTS

RCRA IM Workplan

Paul M. Bergstrand
3 April 2001

GENERAL COMMENTS

1. The Department provided the Navy a reply to the Response to Comments on 29 January 1999 for the Zone A RFI Report. Those comments were made relying on data to be collected during the Zone A CMS workplan and state, in part, "*Because SWMU 39 and SWMU42/505 is being addressed in the CMS, further efforts to evaluate soil and monitoring well data in the RFI will not be pursued.*" The Department also provided comments on the Draft Zone A CMS workplan on 13 July 1998 and replied to the Response to Comments on 15 March 1999. This new CMS data was intended to refine the nature and extent of contamination at this and other Zone A AOCs and SWMUs. That CMS Workplan has reportedly been implemented, however it is not clear if the results have ever been submitted to the Department or included in this document. Not having those results or resolution of the Department's CMS comments makes the conclusion of this IM that *"the site can be used for unrestricted land use following the completion of the IM"* highly questionable. New or unsubmitted data used to develop this workplan should be provided to the Department as soon as possible.

2. The Department recently received new information which may improve our understanding of SWMU 42 and AOC 505 and in turn may impact the current interpretation of data. Primarily, the concern is that the groundwater sample locations at SWMU 42/505 were not adequate to assess the actual SWMU location. This concern is based upon the following points:

    - The 6 June 1995 RFA states in part "*Since the unit (SWMU 42) was taken out of service in the early 1960s, little information was obtained about the dimensions, design features, operating practices, or waste disposal methods.*" And "*Primary materials associated with this unit are waste asphalt products, solvents, and degreasers.*" RFI workplan SWMU boundaries and soil and groundwater sample locations were based on limited information provided in the RFA.

- The Department replied to the Response to Comments on 29 January 1999 for the Zone A RFI Report. Those comments were made relying on data to be collected during the Zone A CMS workplan and state, in part, "*Because SWMU 39 and SWMU42/505 is being addressed in the CMS, further efforts to evaluate soil and monitoring well data in the RFI will not be pursued.*"

- It is not clear if the Ensafe CMS workplan has been implemented, nor is it clear that the results of that CMS workplan have ever been submitted to the Department or included in this document.

- The Department recently received maps of the Charleston Naval Base dated January 1962 and June 1947. These maps indicate that the SWMU 42 Asphalt Plant may be in a location different from the site that is depicted in the RFA or RFI. This information, when coupled with site groundwater elevation contour maps, indicates that the shallow RFI monitoring wells may be up gradient or side gradient of the site they were intended to assess. Copies of the relevant maps with the current monitoring wells drawn in and Figures of groundwater elevations are provided with these comments.

- The Naval Detachment provided a set of air photos taken before 1980. These air photos indicate that AOC 505 may encompass a much larger area than previously thought. The air photos also indicate that items other than railroad ties and ballast may have been stored in this area. The Navy needs to evaluate and discuss the adequacy of sample locations and the type of analysis performed in light of this information. A copy of one of the air photos of 42/505 has been provided with these comments.

- Lithologic cross sections of Zone A provided in the Ensafe CMS portray the area of 42/505 as primarily a sandy aquifer. The Section reportedly has five feet of surface Fill (a variable mixture of clays, silt, sand, gravel and ROC), nine feet of Qc; Quaternary Clayey Sand and Silty Sand (Aquifer) and an estimated thirty or more feet of Qs; Quaternary Sand (Aquifer). Chlorinated solvents, being denser than groundwater, have the ability to migrate downwards through the sandy aquifer. All wells in the 42/505 area are shallow and could miss a rapidly sinking contaminant. A copy of the relevant cross section has been provided with these comments.

- The shallow monitoring wells 042001 and 505001 reported low ppb detections of chlorinated solvents in excess of RBCs and/or MCLs. It is not clear whether these shallow groundwater detections are the edge of a larger and deeper downgradient contaminant plume. Copies of the Groundwater Elevation Contours from the Ensafe CMS Workplan are provided with these comments.

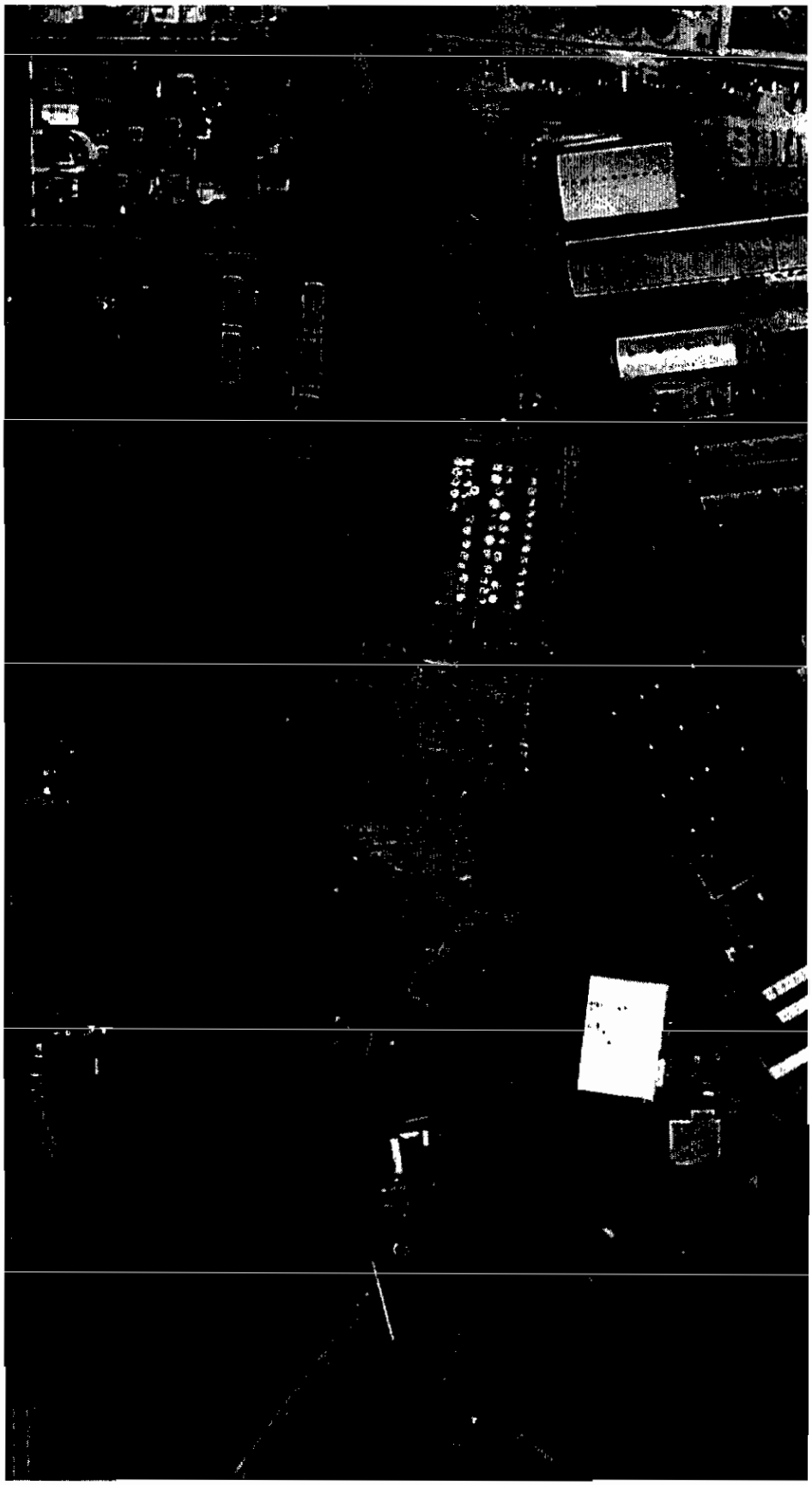
MONITORING WELL 042001

ORGANICS in Groundwater	12-95	4-96	6-96	10-96	*RBC*	*MCL*
Chloromethane	**7.8**	ND	ND	ND	*2.10*	*NL*
Trichloroethene	ND	1.4	**1.6**	ND	*1.6*	*5.0*
Tetrachloroethene	**5.9**	1.5	1.4	ND	*1.10*	*5.0*

MONITORING WELL 505001

ORGANICS in Groundwater	12-95	4-96	6-96	10-96	*RBC*	*MCL*
Chlorobenzene	1.3	ND	ND	ND	*3.90*	*100*
1,1-Dichloroethene	**1.00**	ND	ND	ND	*0.04*	*7.0*
Ethylbenzene	1.2	ND	ND	ND	*130.0*	*700*
1,1,2,2-Tetrachloroethane	**1.5**	ND	ND	ND	*0.05*	*NL*
M+P Xylene	3.5	ND	ND	NS	*NA*	*NL*
O Xylene	1.4	ND	ND	NS	*140*	*10,000*
1,3 Dichlorobenzene	1.8	ND	ND	NS	*54*	*600*
1,2 Dichlorobenzene	1.8	ND	ND	NS	*27*	
1,4 Dichlorobenzene	**2.0**	ND	ND	NS	*0.44*	*75*

3. The Department's concern is that RFI sample locations were not adequate to asses the SWMU and AOC in question. Additional groundwater assessment, including monitoring wells appear to be necessary to complete the assessment of groundwater at this site. Please note, the Department is not suggesting that groundwater corrective action is warranted at this time. However, the Department cannot concur with eliminating groundwater as a medium of concern based on the documentation at hand. The Department will be available to review and discuss this information with the Navy.



5090/11
Code 18B1
2 APR 01

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: SUBMITTAL OF AREA OF CONCERN 518 INTERIM MEASURE WORK PLAN

Dear Mr. Litton,

The purpose of this letter is to submit an Interim Measure Work Plan (Revision 0) for Area of Concern (AOC) 518, Coal Storage Bins, Zone C, located at the Charleston Naval Complex. The work plan is submitted to fulfill the requirements of condition IV.E.2 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency.

The document is distributed under separate cover letter by CH2M Hill. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate. If you should have any questions, please contact Matthew Humphrey or Matthew A. Hunt at (843) 743-9985 and (843) 820-5525 respectively.

Sincerely,

ROBERT A. HARRELL JR., P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4),
USEPA (Dann Spariosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

5090/11
Code 18713
02 APR 01

Mr. John Litton, P.E.
Director, Division of Hazardous and Infectious Waste Management
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Subj: SUBMITTAL OF CORRECTIVE MEASURES STUDY WORK PLAN FOR SWMU 47, ZONE C

Dear Mr. Litton,

The purpose of this letter is to submit the Corrective Measures Study Work Plan (Revision 1) for SWMU 47, Zone C, located at the Charleston Naval Complex. The work plan is submitted to fulfill the requirements of condition IV.E.2 of the RCRA Part B permit issued to the Navy by the South Carolina Department of Health and Environmental Control and the U.S. Environmental Protection Agency (EPA).

This document and the proposed rationale for no further action were discussed by the Charleston Naval Complex BRAC Cleanup Team. CH2M Hill has distributed the document under separate cover letter. Appropriate certification is provided under that correspondence. We request that the Department and the EPA review this document and provide comments or approval whichever is appropriate.

If you should have any questions, please contact, Matthew Humphrey or myself at (843) 743-9985 and (843) 820-5551 respectively.

Sincerely,

ROBERT A. HARRELL, JR., P.E.
Environmental Engineer
BRAC Division

Copy to:
SCDHEC (4)
USEPA (Dann Sparlosu)
CSO Naval Base Charleston (Matt Humphrey)
CH2M-Hill (Dean Williamson)

CIRC 18713 DAILY

18713

CH2M HILL
3011 S.W. Williston Road
Gainesville, FL
32608-3928
Mailing address:
P.O. Box 147009
Gainesville, FL
32614-7009
Tel 352.335.7991
Fax 352.335.2959

CH2MHILL

April 2, 2001

John Litton, P.E.
Director
Division of Hazardous and Infectious Wastes
South Carolina Department of Health and
Environmental Control
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

Dear Mr. Litton:

Enclosed please find four copies of the Interim Measure Work Plan for Soil Removal at AOC 518, Zone C at the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

Please contact me if you have any questions or comments.

Sincerely,

Dean Williamson, P.E.

xc: Tony Hunt/Navy, w/att
Rob Harrell/Navy, w/att
Mihir Mehta/SCDHEC
Gary Foster/CH2M HILL, w/att